



## CHAPTER 14

# Latest Trends in IT

### 14. Latest Trends in IT

This chapter gives you the information about current happenings & future trends in IT, Communication & Networking sectors and how IT can help you to be more productive in daily life. This chapter also explains some common computer uses like how to write a CD or how to protect your computer for virus etc. with a special focus on Windows 10 operating system features.

#### 14.1 DVD Writing/Burning

If your computer includes a CD or DVD recorder, you can copy files to a writeable disc. This process is called burning a disc. In Windows 10, you can write DVD in **Windows Media Player**. This method is free but your files must be in the format that Windows Media Player supports. You will not be able to add menus or graphics to customize the DVD disc. Also DVD Making (Writing) process is a little bit long so wait enough time before DVD making is finished.

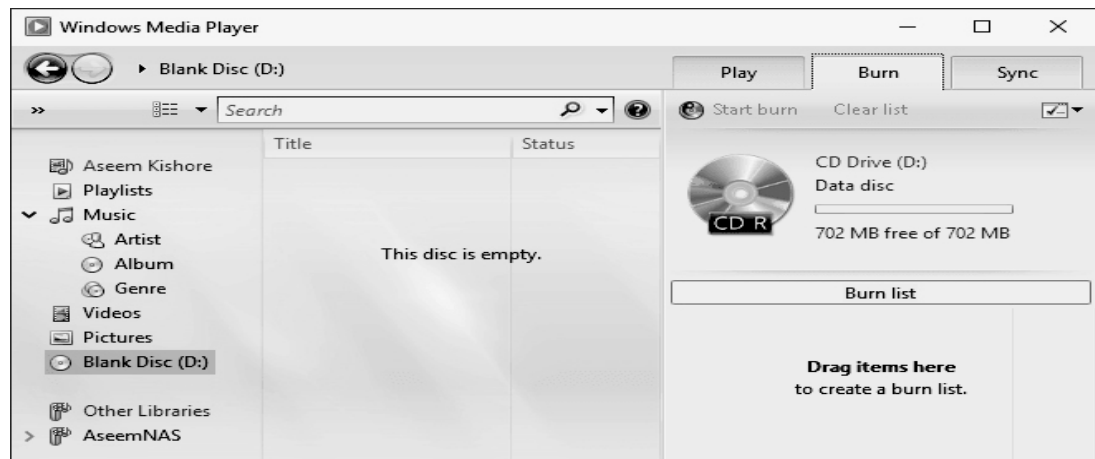


Figure 14.1 – DVD Writing using Media Player

The steps to write/burn a DVD/CD using Windows 10 inbuilt utility is given below:-

- Open Windows Media Player
- In the Windows Media Player Library, tap or click the Burn tab, tap or click the Burn options button Options button and then tap or click Data DVD.
- Insert a blank disc into your DVD driver.
- If you see the list from your last selection and want to start a new list, tap or click the Clear list button to remove the previous one.
- Find the items in your Player Library that you want to burn to the disc.
- Drag items from the details pane (in the middle of the Player Library) to the list pane (on the right side of the Player Library) to create a burn list.
- If you want to change the order of the items in the burn list, drag the item up or down in the list.
- If you want to remove an item from the burn list, double-tap or right-click the item, and then tap or click Remove from list.
- When you're happy with the list, tap or click Start burn.

## 14.2 Virus Protection – Windows Defender Anti-Virus & Windows Firewall

Windows 10 has built-in real-time antivirus, just as Windows 8 did. It automatically runs in the background, ensuring all Windows users have a baseline level of antivirus protection. This basic inbuilt product is named “**Windows Defender**”.

Like other anti-malware applications, Windows Defender automatically runs in the background, scanning files when they're accessed and before you open them.

It will only pop up and inform you when it finds a malware. It won't even ask you what you want to do with the malicious software it finds — it will clean it up and quarantine the files automatically. You'll see a “Malware detected” notification saying “Windows Defender is taking action to clean detected malware” or

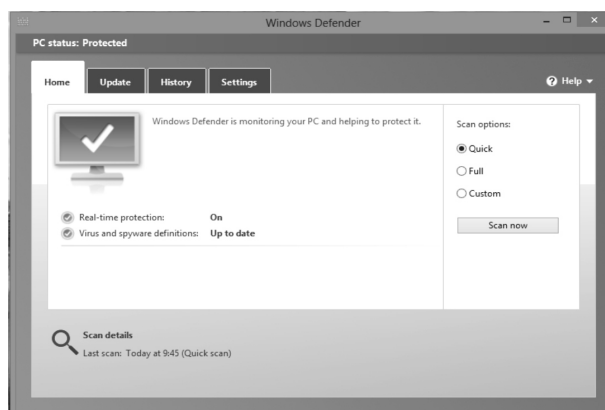


Figure 14.2 – Windows Defender

“Detected threats are being cleaned.” It will appear in the notification center, too.

Antivirus definition updates will automatically arrive through Windows Update and be installed like any other system update. These types of updates don't require rebooting your computer. You don't need to worry about updating Windows Defender.

You can turn off real-time protection temporarily by selecting the Start icon button, and then selecting **Settings > Update & security > Windows Defender**.

**Windows Firewall** filters info coming into your PC from the Internet, blocking potentially harmful programs. To turn it off, go to the search box and type firewall. Then select **Windows Firewall > Turn Windows Firewall on or off**.

## 14.3 Getting More Productivity from Computer

With respect to **Windows 10 Operating System** and keeping in mind the most useful inbuilt features of Operating System that can be put to use by a normal user, we have herewith enlisted the following major productive uses of Windows 10 Computer:

### 14.3.1 Cortana

Cortana is a digital personal assistant that can help you find files on your PC, remind you of appointments you might miss, chat with you, suggest music you might love and more. In order to do that well, Cortana needs to understand your interests and preferences.



Figure 14.3 - Cortana

The more you use Cortana, the more personalized your experience will be. To get started, type a question in the search box on the taskbar. Or select the microphone icon and talk to Cortana. (Typing works for all types of PCs, but you need a mic to talk)

### 14.3.2 Back Up & Restore

It's always good to have a backup. Keep copies of your files on another drive in case something happens to the originals.

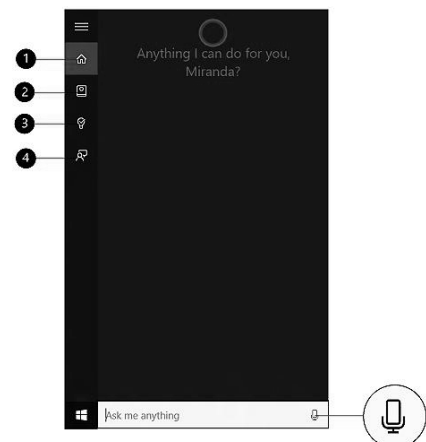


Figure 14.4 – Cortana Interface

#### Set up your Backup

Select the **Start** icon button, then select **Settings > Update & security > Backup > Add a drive** and choose an external drive or network location for your backups.

## Restore your Files

If you're missing an important file or folder, here's how to get it back:

- Search for Restore files from the taskbar and select Restore your files with File History.
- Look for the file you need and then use the arrows to see all its versions.
- When you find the version you want, select the **Restore** button to save it in its original location. To save it in a different place, right-click (or press and hold) the **Restore** button, select Restore to, and then choose a new location.

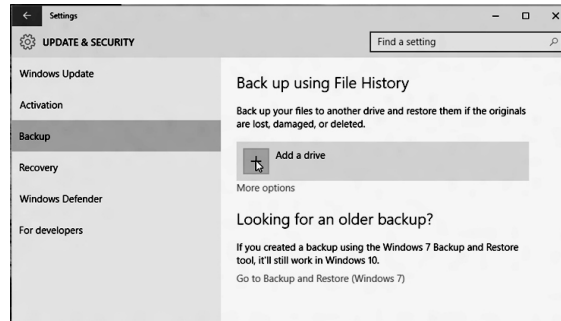


Figure 14.5 - Backup

### 14.3.3 Screen Cast

Miracast is the technology Microsoft uses in Windows to wirelessly push or mirror your screen and audio to a remote screen or monitor. To make it work, you need a wireless receiver attached to the remote screen like Microsoft Wireless Display Adapter. In Windows 10, all device connection actions, including projecting your screen, is now part of the Connect setting.

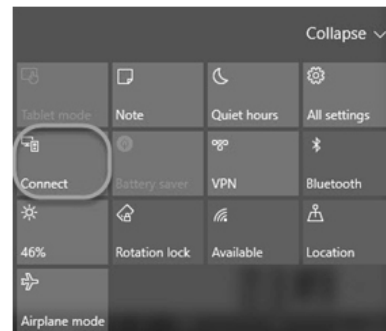


Figure 14.6 – Screen Cast Connect

To get to it quickly, just tap or click the Action Center and locate the Connect button.

### 14.3.4 Microsoft Smart Screen Filter

SmartScreen online services (feature of Edge browser) help to protect you and your device from unsafe web contents or malicious software. SmartScreen Filter helps detect phishing websites. SmartScreen Filter can also help protect you from installing malicious software or malware which are programs that demonstrate illegal, viral, fraudulent or malicious behavior.

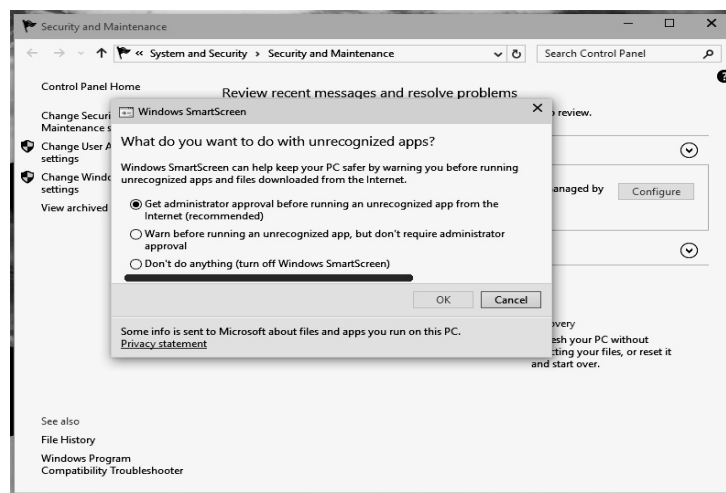


Figure 14.7 – Smart Screen



### 14.3.5 File Sharing – Share Button

If you are browsing through your photos in File Explorer, when you see an adorable picture of your baby that you absolutely must upload to Facebook right now. On Windows 10, you can share directly from the File Explorer with the new Share button.

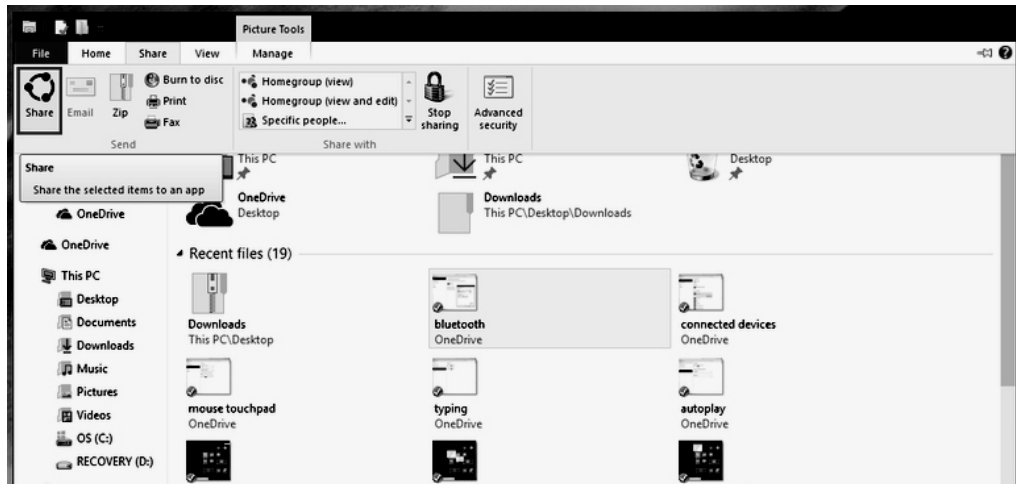


Figure 14.8 – File Share

You can share any file type, although you cannot share any file type with any app.

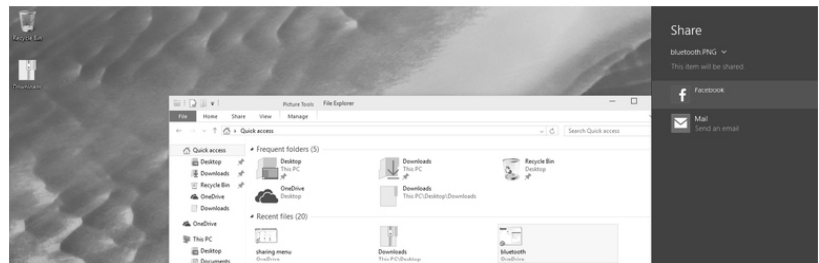


Figure 14.9 – Share Button

### 14.3.6 Windows Store for Apps

You can get free mobile apps (mobile applications) and games in **Windows Store**. To find the Store, select the Start icon button, then select Store Windows Store logo or select it from the taskbar. (You'll need an Internet connection and a Microsoft account.) Use Search to quickly find what you're looking for or browse top charts, categories, and custom collections.

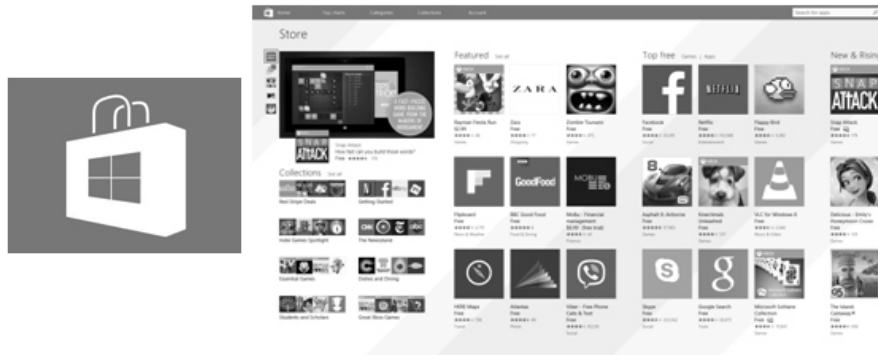


Figure 14.10 – Windows Store

When you find something you want, choose it and then select Free if it's free, the price or Try, if it's a paid app. Buy once, enjoy anywhere, on any compatible device—phone, laptop, desktop or Xbox.

### 14.3.7 Windows Hello

Windows Hello is a more personal way to sign in to your Windows 10 devices with just a look or a touch. You'll get enterprise-grade security without having to type in a password.

Windows Hello, part of Windows 10, is a new way to sign in to your devices, apps, online services and networks. Windows Hello works with a credential technology called Microsoft Passport that's easier more convenient and more secure than using a password, because it uses "**Biometric Authentication**"—you sign in with your **Face**, **iris** (thin, circular structure in the eye) or **Fingerprint** (or a PIN).



Figure 14.11 – Windows Hello

### 14.3.8 Windows Passport

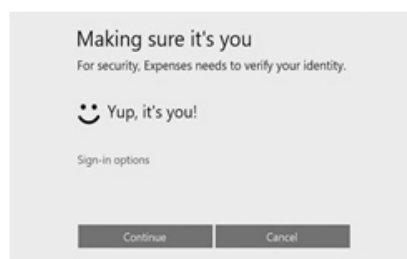
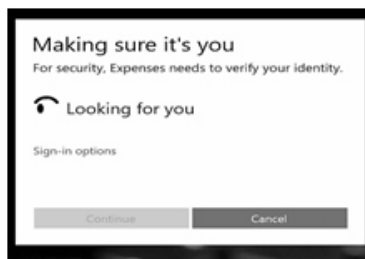


Figure 14.12 – Windows Passport

Microsoft Passport will work by having you authenticate your identity and that you have the device in your possession. If the device has Windows Hello compatible hardware

then it will use biometrics to verify your identity on that device. Once that is done and you are properly authenticated then you can sites and services that use the same validation technology.

Microsoft Passport also enables Windows 10 Mobile devices to be used as a remote credential when signing into Windows 10 PCs.

### 14.3.9 Skype Integration

Do you want to send quick messages from your PC to your family while you're working? Need help cooking at home and want to show your sister exactly

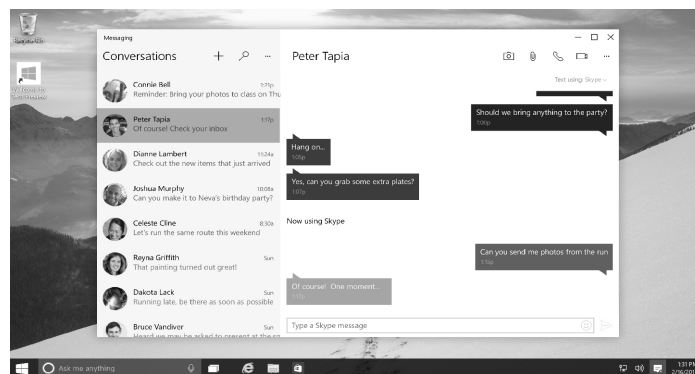


Figure 14.13 – Skype Interface

what you are seeing with a couple clicks? Now you can connect with them straight from your PC's taskbar.

Microsoft has built selected **Skype** video calling and messaging features, like 1:1 messaging, calling and emoticons into native Windows 10 apps to make communicating from your desktop quick and easy.

### 14.3.10 One Drive – Cloud Based File Sharing

Get to your files from anywhere, on any device with Microsoft OneDrive. Share and work together with anyone in your work and life.

OneDrive has become an important part of Microsoft's platform, and in Windows 10 it's baked right into the Operating System. You're set up for it when you log in with a Microsoft Account and you'll find the storage available in File Explorer. There's no app to open, download or install – it's just there from the start for you to use.

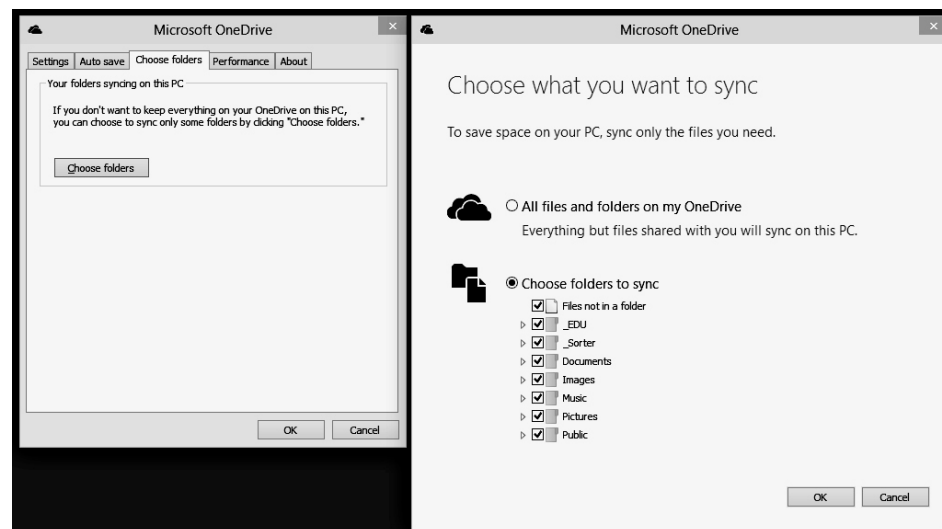


Figure 14.14 – One Drive

OneDrive's major benefit is that it syncs across platforms and integrates with the services and applications you already use including Windows, Office, Outlook, Cortana and more to follow.

### 14.3.11 WiFi Sense

Windows 10 comes with a new feature called Wi-Fi Sense which lets your PC automatically connect to **Wi-Fi** networks that your friends and acquaintances have previously connected to, even if you don't know the network password.

By default, it will not share **Wi-Fi** passwords with

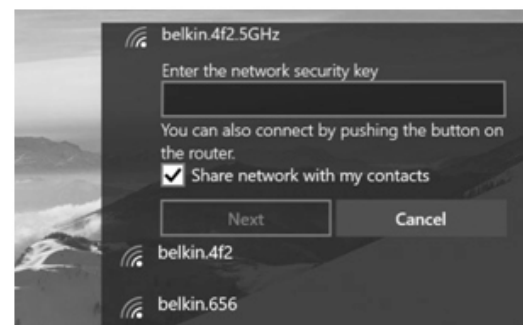


Figure 14.15 – WiFi Sense

anyone else. For every network you join, you'll be asked if you want to share it with your friends/social networks.

As per Microsoft, Wi-Fi Sense only shares your passwords with direct friends/ contacts and not friends-of-friends. For example, if Rahul shares a passkey with Vikram via Wi-Fi Sense, Vikram cannot then use Wi-Fi Sense to share Rahul's passkey with his friend Narendra.

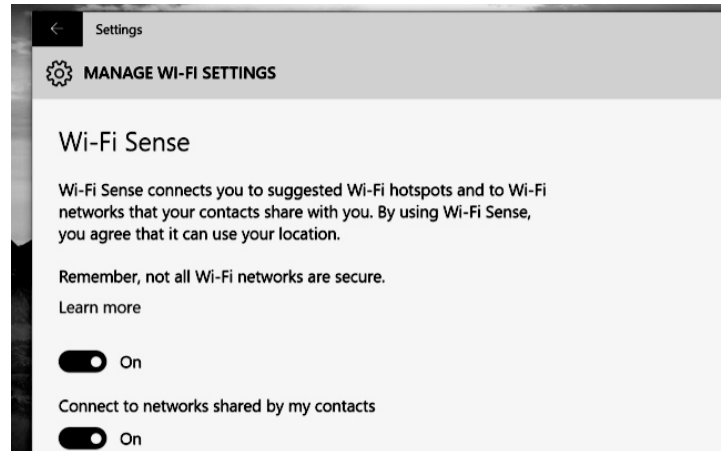


Figure 14.16 – WiFi Sense interface

### 14.3.12 Maps

Maps is your guide to everywhere. Find your way with voice navigation and turn-by-turn driving, transit, and walking directions. Search for places to get directions, business info, and reviews. As the Maps app is shipped along with Windows 10, you just have to launch the app from Start Menu or searching for “Maps” using the search functionality. If you are

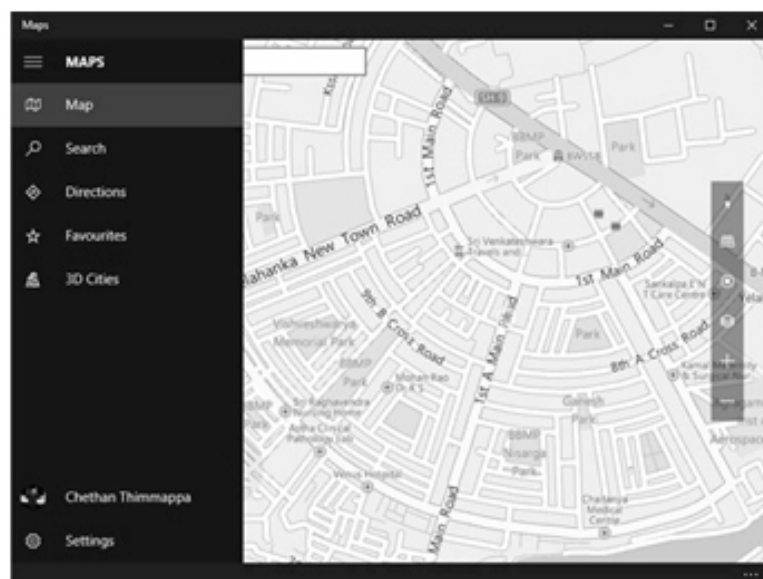


Figure 14.17 - Maps

launching the Maps app for the first time, you need an active internet connection in order to download maps which are relevant to your location.

The new Maps app can run on all Windows 10 devices - from PCs to mobiles, and everything else in between.

### 14.3.13 Snap Assist

With Windows 10 you have the option to place up to four windows on a single screen. If you have a

multiple monitor setup, this also means you can have up to four windows running on each screen. But getting the hang of using Windows 10's "Snap Assist" takes practice.

The ability to have multiple apps running on a single screen allows you to be more productive. You can write a document in one window, watch your Twitter feed in another and so on.

#### 14.3.14 Speech Recognition

Windows Speech Recognition lets you control your PC with your voice alone, without needing a keyboard or mouse. There's a wizard to help you get started. Just plug in your microphone and then in the search box on the taskbar, type Speech Recognition and select Windows Speech Recognition.

After you complete the wizard, you can walk through a tutorial to learn voice commands and train your PC to recognize your voice. For additional options, type Control Panel in the search box on the taskbar and select **Control Panel**. Then select **Ease of Access > Speech Recognition**.

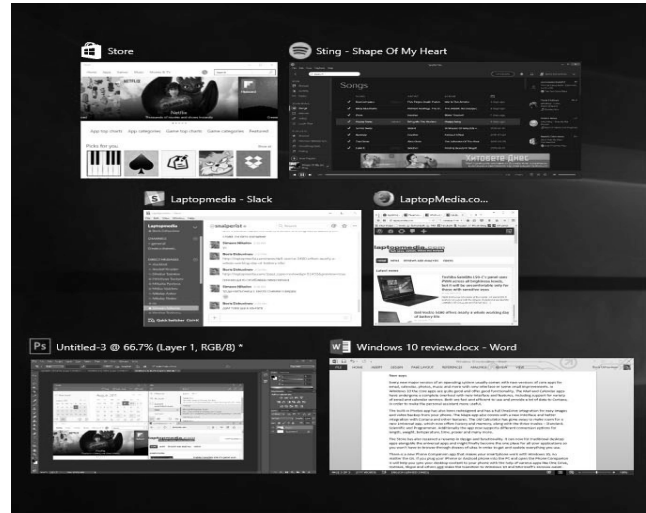


Figure 14.18 – Snap Assist



Figure 14.19 – Speech Recognition

### USEFUL TIP

Microsoft Maps when used on Windows smartphone can help us find our routes in real time while traveling and give us turn by turn navigation. Kindly insist your faculty to show you a demo.

## QUICK REVIEW

- What are the steps to Burn a DVD/CD in Windows 10?
- What are major productivity features of Windows 10 based PC?

### 14.4 Latest Terms & Technologies

In this section we have shortlisted some latest terms and technologies from the areas of I.T., Electronics Technology & Communication areas so that you can have a basic overview of updated industry trends and buzzwords.

#### 14.4.1 3D Printing

3D printing, also known as additive manufacturing (AM), refers to various processes used to synthesize a three-dimensional object. In 3D printing, successive layers of material are formed under computer control to create an object. These objects can be of almost any shape or geometry and are produced from a 3D model or other electronic data source. A 3D printer is a type of industrial robot.



Figure 14.20 – 3D Printing

Using the power of the Internet, it may eventually be possible to send a blueprint of any product to any place in the world to be replicated by a 3D printer with "elemental inks" capable of being combined into any material substance of any desired form.

#### 14.4.2 4K & 8K display (UHD - Ultra High Definition)

The latest development in TV/Display field is Ultra-high-definition television - also known as Ultra HD, UHD, and UHDTV. Two resolutions are defined as UHDTV:

- **4K UHDTV** (2160p) is 3840 pixels wide by 2160 pixels tall (8.29 megapixels), which is four times as many pixels as 1920x1080 (2.07 megapixels).
- **8K UHDTV** (4320p) is 7680 pixels wide by 4320 pixels tall

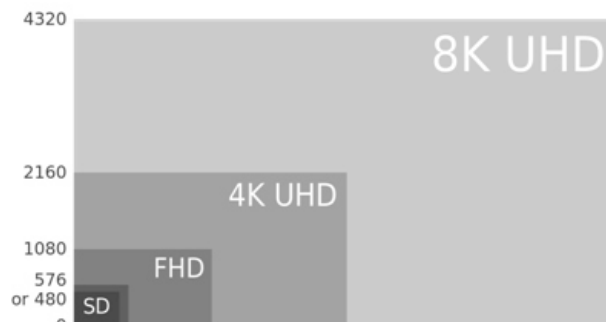


Figure 14.21 – Display Standards

(33.18 megapixels), which is sixteen times as many pixels and four times the special resolution of current 1080p HDTV.

### 14.4.3 AI (Artificial Intelligence)

Defined as the part of computer science concerned with designing systems that exhibit the characteristics associated with human intelligence—understanding language, learning, reasoning, solving problems etc. For example: Robotics, Apple's Siri & Google Now



Figure 14.22 – Artificial Intelligence

### 14.4.4 AR (Augmented Reality)

Augmented reality (AR - e.g. Google Glass, Microsoft HoloLens etc.) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. In this a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality.



Figure 14.23 – Augmented Reality

Augmentation is conventionally in real-time and in semantic context with environmental elements, such as sports scores on TV during a match. With the help of advanced AR technology artificial information about the environment and its objects can be overlaid on the real world.

#### 14.4.4.1 Google Glass

Google Glass is a headset, or optical head-mounted display, that is worn like a pair of eyeglasses. It



Figure 14.24 – Google Glass

was developed with the mission of producing a ubiquitous computer. Google Glass displays information in a smartphone-like hands-free format. Wearers communicated with the Internet via natural language voice commands.

#### 14.4.5 Smart Wearable Computer (use of BAN)

Wearable computers, also known as body-borne computers or wearables are miniature electronic devices that are worn by the bearer under, with or on top of clothing. This class of wearable technology has been developed for general or special purpose information technologies and media development.

One of the main features of a wearable computer is consistency. There is a constant interaction between the computer and user, i.e. there is no need to turn the device on or off. Another feature is the ability to multi-task. For example Apple Watch, Samsung Gear, Fitbit activity tracker, Google Glass



Figure 14.25 – Smart Wearable

Smart Wearable computer typically uses BAN (Body Area Network) to communicate. BAN devices/sensors may be embedded inside the body, implants, may be surface-mounted on the body in a fixed position.

#### 14.4.6 Big Data

Big data is a term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis. But it's not the amount of data that's important. It's what organizations do with the data that matters. Big data can be analyzed for insights that lead to better decisions and strategic business moves.

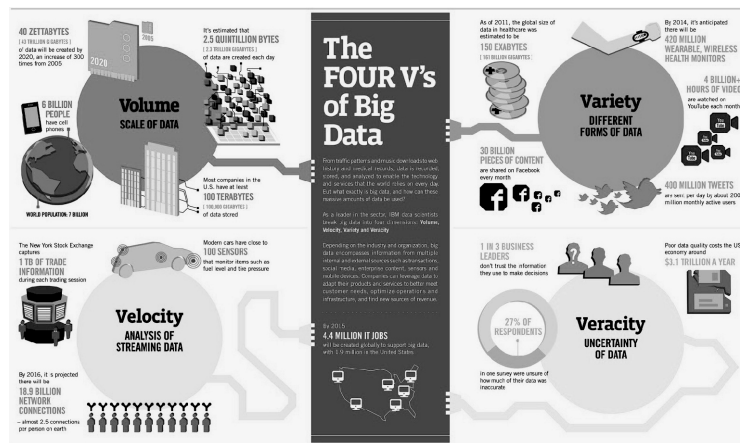


Figure 14.26 – Big Data

You can take data from any source and analyze it to find answers that enable

- Cost reductions
- Time reductions
- New product development and optimized offerings
- Smart decision making

#### 14.4.7 Drone (Unmanned Aerial Vehicle– UAV)

An unmanned aerial vehicle (UAV) commonly known as a Drone and also referred by several



other names, is an aircraft without a human pilot aboard. The flight of UAVs may be controlled either autonomously by onboard computers or by the remote control of a pilot on the ground or in another vehicle. Unmanned aerial vehicles have mostly found in military and special operation applications but also are increasingly finding uses in civil applications, such as policing, logistics, surveillance and firefighting and nonmilitary security work such as inspection of power or pipelines.



Figure 14.27 - Drone

### 14.4.8 IoT (Internet of Things)

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity which enables these objects to collect and exchange data over the cloud.



Figure 14.28 – Internet of Things

The Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring

human-to-human or human-to-computer interaction. IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS) and the Internet.

The Internet of Things really comes together with the connection of sensors and machines. The Internet of Things basically revolves around increased machine-to-machine communication (M2M).

### 14.4.9 Li-Fi

LiFi is the use of the visible light portion of the electromagnetic spectrum to transmit information at very high speeds. This is in contrast to established forms of wireless communication such as Wi-Fi which use traditional radio frequency (RF) signals to transmit data.

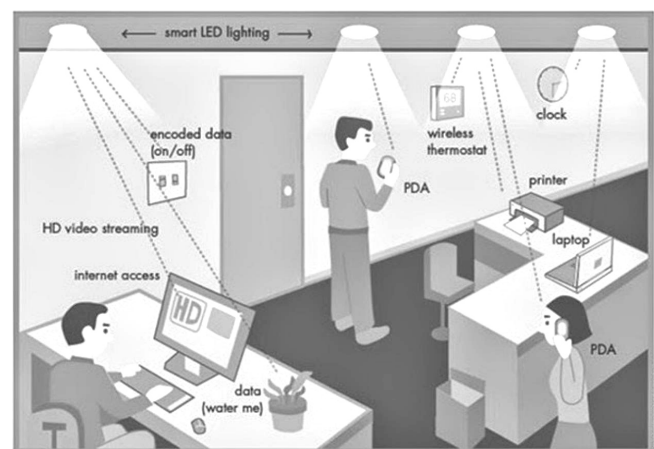


Figure 14.29 – Li-Fi

It is so far measured to be about 100 times faster than some Wi-Fi implementations reaching speeds of 224 gigabits per second.

#### 14.4.10 VR (Virtual Reality)

VR (Immersive Multimedia) involves using computer technology to create a simulated, 3D world that a user can manipulate & explore while feeling as if he were in that world. Used in Games, Training, etc. Typically a VR experience includes the following 3 components:



Figure 14.30 – VR Headset

- 3D images that appear to be life sized from user perspective.
- Ability to track user's motions, particularly his head & eye so as to adjust the images on users display to reflect change in perspective.

Few examples are Oculus Rift, HTC Vive, PlayStation VR, Google Cardboard

#### 14.4.11 Wireless Charging (also called Inductive Charging)

Wireless Charging is just what it sounds like — a way to charge your phone, tablet or other device without using any wires. Wireless charging is as simple as placing your device on a charging pad and letting the magic happen. The charger itself is of course connected to a power source but your device doesn't have to be physically plugged in.



Figure 14.31 – Wireless Charging

More and more Android devices are supporting wireless charging, and it's likely that soon all Android devices will support this method. Wireless charging is still less efficient and more costly than standard charging over a wire.

### 14.5 Smart Phones/Mobile Operating Systems/App Stores/Mobile Communication Technologies

Under this section we will learn about the basics of Smart devices, different form factors of phones/smartphones, types of mobile OS, App platforms & also latest mobile communication technologies.

#### 14.5.1 Device Types & Form Factors

Based on various factor & use cases, mobile communication/entertainment devices can be broadly classified into following major categories:

### Feature Phone

A feature phone is a class of mobile phone to describe low-end mobile phones which are limited in capabilities in contrast to a modern smartphone. Feature phones typically provide voice calling and text messaging functionality, in addition to basic multimedia and internet capabilities, and other services offered by the user's wireless service provider. Feature phones are marketed as a lower-cost alternative to smartphones, especially in emerging markets.

### Smartphone

A smartphone is a mobile phone with an advanced mobile operating system which combines features of a personal computer operating system with other features useful for mobile or handheld use. They typically combine the features of a cell phone with those of other popular mobile devices such as personal digital assistant (PDA), media player and GPS navigation unit. Most smartphones can access the Internet, have a touchscreen user interface (with a Gorilla Glass protection), can run third-party apps, music players and have camera phones. Most recent smartphones also have high-speed mobile broadband 4G LTE internet, motion sensors, and mobile payment options.



Figure 14.32 – Smart Device Types

### iPods

iPod is a line of portable media players and multi-purpose pocket computers designed and marketed by Apple Inc. Like other digital music players, iPods can serve as external data storage devices.

### Tablets

A tablet computer commonly shortened to tablet, is a mobile computer with a touchscreen display, circuitry and battery in a single device. Tablets come equipped with sensors, including cameras, a microphone, and an accelerometer, and the touchscreen display uses the recognition of finger or stylus gestures replacing the usage of the mouse and keyboard.

They usually feature on-screen pop-up virtual keyboards for typing. Tablets may have physical buttons for basic features such as speaker volume and power and ports for network communications and battery charging. Tablets are typically larger than smartphones with screens 7 inches (18 cm) or larger, measured diagonally. Examples include Apple iPad, Microsoft Surface etc.

## USEFUL TIP

Phablet is a new category of devices which lies in between a smartphone and tablet. They are having typically large sized display (5.5 inch and more) and used primarily for media consumption and communication alike.

### 14.5.2 Mobile Operating Systems

A mobile operating system, also called a mobile OS, is an operating system that is specifically designed to run on mobile devices such as mobile phones, smartphones, PDAs, tablet computers and other handheld devices. The mobile operating system is the software platform on top of which other programs, called application programs, can run on mobile devices.



Figure 14.33 – Major Mobile OS

#### Google's Android OS

Android OS is owned by Google and powered by the Linux kernel, which can be found on a wide range of devices. Android is an open source operating system which allows developers to access unlocked hardware and develop new programs as they wish. Android is currently the dominant smartphone platform due to its tremendous traction with a wide spectrum of users.

Some of the best features of Android include the ability to customize multiple home screens with useful widgets and apps that give you quicker, easier access to the content and functions you most care about. It also has an excellent capacity for multitasking - with the ability to close programs by simply swiping them away. Last but not least, the Android Market, which is the Android equivalent of the Apple App Store is home to millions of apps, many of which are completely free.

#### Apple's iOS

The Apple iOS multi-touch, multi-tasking operating system is what runs the Apple's iPhone, iPad, and iPod. A special version of the software is what powers the Apple Watch too.

iOS responds to the user's touch - allowing you to tap on the screen to open a program, pinch your fingers together to minimize or enlarge an image, or swipe your finger across the screen to change pages.

The Apple iOS is not allowed to be used in third party systems so you will only be able to use it on products made by Apple. It comes with the Safari web browser for internet use, an iPod application for playing music and Apple's Mail for managing your emails.

## Microsoft Windows 10 Mobile

Windows 10 Mobile is from Microsoft. It is closed source and proprietary. It has the third largest installed base on smartphones behind Android and iOS.

Phone includes a user interface inspired by Microsoft's "Metro Design Language". It is integrated with Microsoft services such as OneDrive and Office, Xbox Music, Xbox Video, Xbox Live games and Bing, but also integrates with many other non-Microsoft services such as Facebook and Google accounts.

### QUICK REVIEW

- ▶ What are the major Mobile Operating Systems?
- ▶ Which is the latest version Google's Android mobile operating system?

### 14.5.3 Types of App Stores

A Mobile App is a computer program designed to run on mobile devices such as smartphones and tablet computers. Most such devices are sold with several apps bundled as pre-installed software such as a web browser, email client, calendar, mapping program and an app for buying music or other media or more apps. Some pre-installed apps can be removed by an ordinary uninstall process, thus leaving more storage space for desired ones.

Apps that are not preinstalled are usually available through distribution platforms called app stores. Some apps are free, while others must be bought. Usually, they are downloaded from the platform to a target device. The term "app" is a shortening of the term "application software".

With reference to 3 major Mobile operating systems as discussed in last section, we will discuss three major App Stores.

**Google Play Store** Google Play is an international online software store developed by Google for Android devices. It opened in October 2008. It serves as the official app store for the Android operating system, allowing users to browse and download applications developed with the Android SDK and published through Google. Google Play also serves as a digital media store, offering music, magazines, books, movies, and television programs.

#### Apple App Store

Apple's App Store for iOS ignited the mobile revolution and was opened on July 10, 2008. The



Figure 14.34 – Mobile OS Types

service allows users to purchase and download new apps for their device through either the App Store on the device, or through the iTunes Store on the iTunes desktop software.

## Windows Store

Windows Store is an app store for Microsoft Windows 10 Mobile. It is the primary means of distributing Metro-style apps, although traditional desktop apps can also be listed on it. Both free and paid apps can be distributed through Windows Store.

## How to Install an App

With above backdrop, we will take example of Google Play Store & show you how to easily install an App on your Android smartphone.



The primary way you'll install apps on Android is by firing up the inbuilt **Play Store app** on your phone or tablet. You'll find the Play Store in your app drawer and likely on your default home screen. You can also open it by tapping the shopping bag-like icon at the top-right corner of the app drawer. Once in the store, browse or search for an app and tap the Install button to install it. The process to install a gaming app is depicted below:-

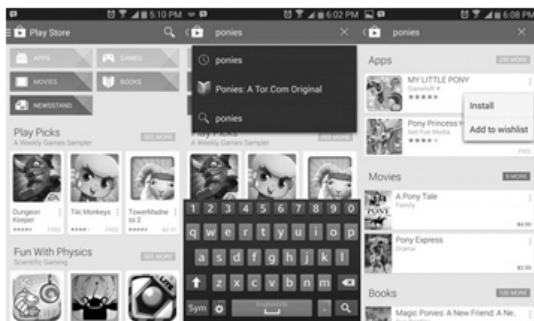


Figure 14.35 – Searching a Game

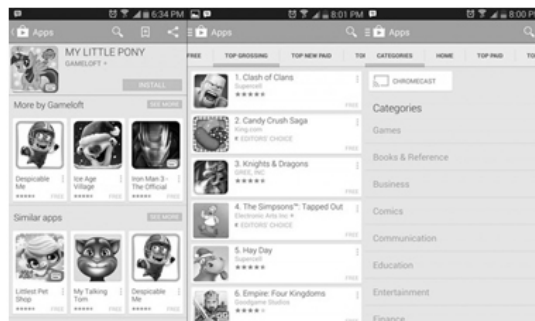


Figure 14.36 – Finding a Game

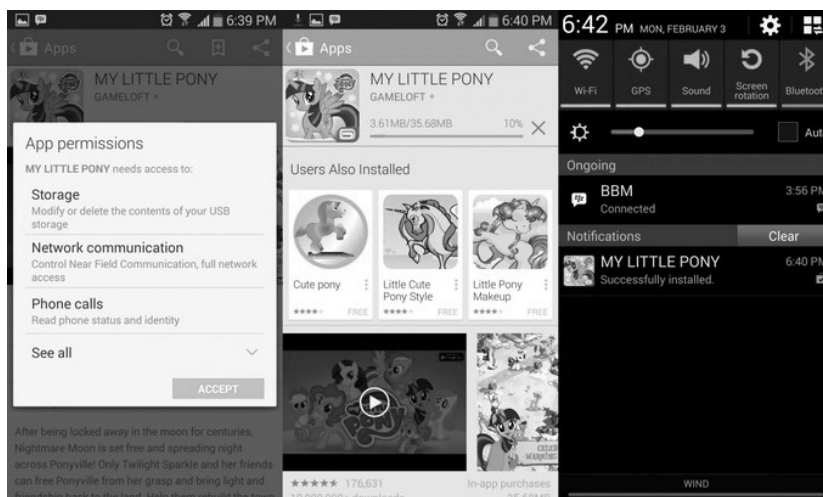


Figure 14.37 – Installing a Game

## USEFUL TIP

If you own an Android smartphone powered with 2G / 3G internet, we suggest you try installing an app as explained. It is very easy and fun. You can search various categories of Apps on Google Play Store.

### 14.5.4 Mobile Communication Technologies

In this section we will learn latest wireless communication technologies for mobile devices.

#### 3G (3<sup>rd</sup> Generation)

This generation set the standards for most of the wireless technology we have come to know and love. Web browsing, email, video downloading, picture sharing and other Smartphone technology were introduced in the third generation. 3G should be capable of handling around 2 Megabits per second.

#### 4G (4<sup>th</sup> Generation)

The speed and standards of this technology of wireless needs to be at least 100 Megabits per second and up to 1 Gigabit per second to pass as 4G. It also needs to share the network resources to support more simultaneous connections

on the cell. As it develops, 4G could surpass the speed of the average wireless broadband home Internet connection. Few devices are capable of the full throttle yet. Coverage of true 4G is limited to large metropolitan areas. For now, 4G is simply a little faster than 3G.

#### 4GLTE

This buzzword is a version of 4G that is becoming the latest advertised technology but still not true 4G as the standards are set. When talking about 4G, things can get a little confusing. Basically, there is 4G and 4G LTE. Many people consider LTE to be true 4G technology. Generally, if a cellular provider describes a 4G network without mentioning LTE, they are probably talking about a High Speed Packet Access (HSPA) network. The HSPA network is a faster version of the 3G GSM network. While not as fast as an LTE network, it is still faster than a 3G network. Since LTE is still relatively new, the cellular providers haven't fully built out their LTE network.

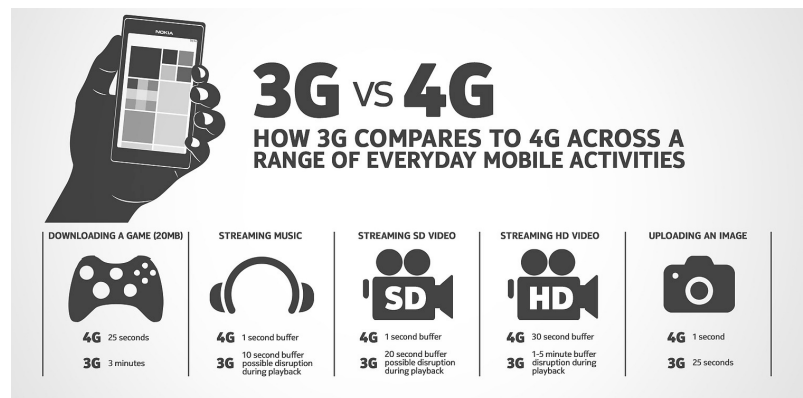


Figure 14.38 – 3G & 4G Comparison

**NFC (Near Field Communication)**  
– **Use of Android Beam**

Near field communication (NFC) is a set of wireless communication protocols that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication by bringing them within 10 cm (4 in) of each other. NFC allows you to share small payloads of data between an NFC tag and an Android-powered device, or between two Android-powered devices.

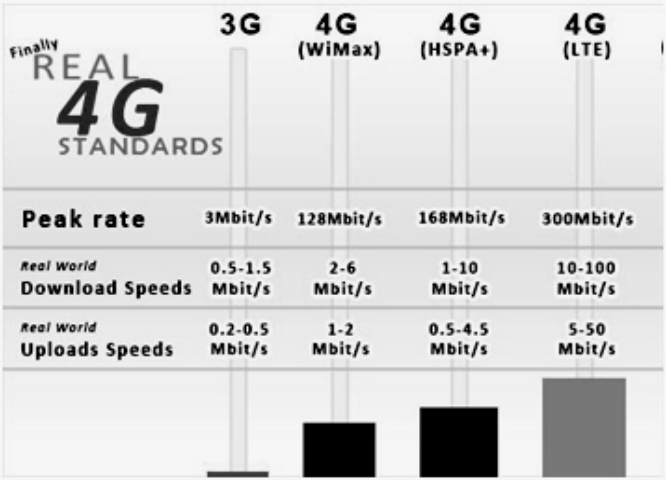


Figure 14.39 – High Speed Mobile Communication Technologies

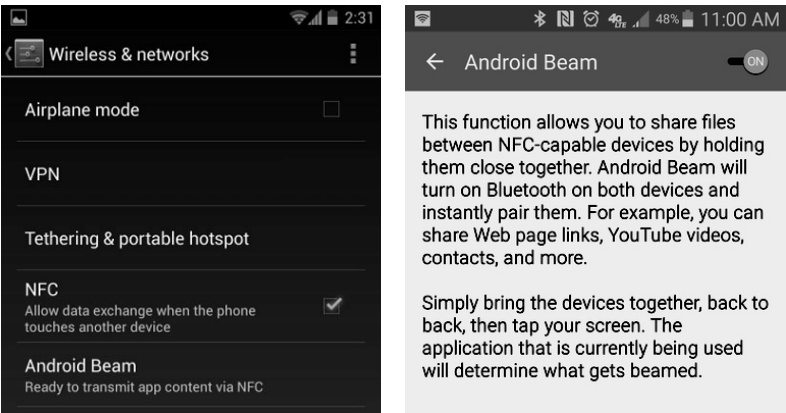


Figure 14.40 - NFC

NFC-equipped android smartphones and other devices can exchange information with each other with a simple tap or wave. It can be enabled under Settings menu of your latest Android smartphone & **Android Beam utility** can be used to share the files.

NFC is really a newer version or extension of RFID. RFID waves can have very long ranges while NFC limits the range of communication to within 4 inches. This makes NFC perfect for more secure applications like paying for things or securely logging in at a location.

**Mobile Wi-Fi Hotspot & Tethering**

A hotspot is a physical location that offers Internet access over a wireless local area network (WLAN) through the use of a router connected to a link to an Internet service provider. Hotspots typically use Wi-Fi

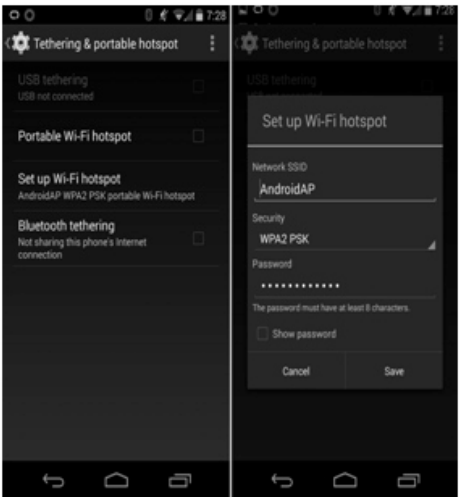


Figure 14.41 – WiFi Hotspot



technology. Many Wi-Fi adapters built into or easily added to consumer computers and mobile devices include the functionality to operate as private or mobile portable hotspots, sometimes referred to as "mi-fi".

The use of a private hotspot to enable other personal devices to access the WAN (usually but not always the Internet) is a form of bridging, and known as tethering. After Wi-Fi hotspot tethering & connecting to the mobile phone data network, the smartphone can distribute its Internet connection to several clients via a Wi-Fi connection. Any Wi-Fi-enabled computer or tablet can connect to it, and the real bonus is that the Wi-Fi router is inside your phone so there's no extra stuff to carry with you.

The steps to turn on Mobile Wi-Fi Hotspot are shared below:

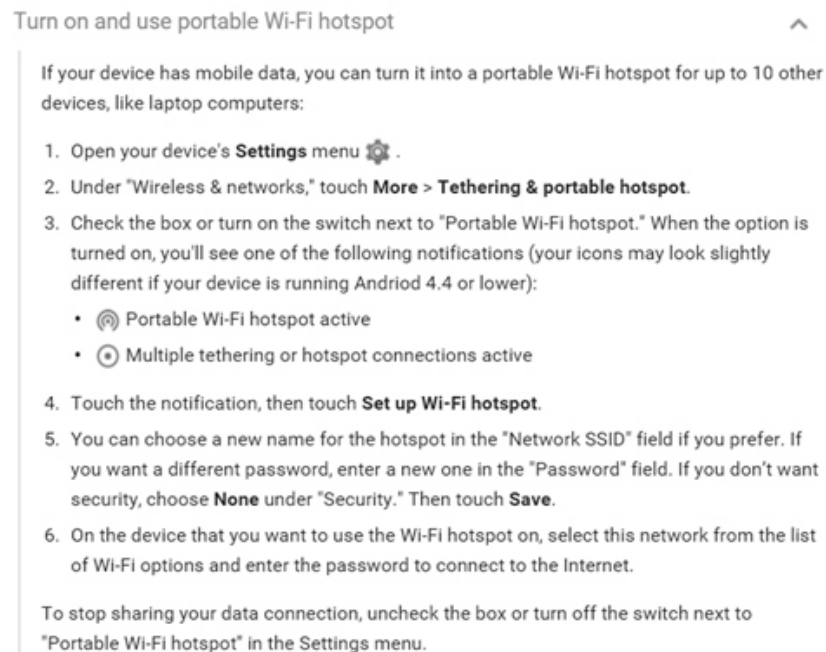


Figure 14.42 – Mobile Hotspot

### USEFUL TIP

Mobile Wi-Fi Hot Spot utility is an excellent tethering tool for sharing your mobile internet plan with your PC or Tablet in absence of wired broadband or home Wi-Fi connections. It thus improves productivity on the go.

### QUICK REVIEW

- What is 3G?
- What are the differences between 3G & 4G?
- What is NFC?

### 14.5.5 Latest Processor Technologies – Desktop/PC Platform

A processor is the logic circuitry that responds to and processes the basic instructions that drive a computer. The term processor has generally replaced the term Central Processing Unit (CPU). The processor in a personal computer or embedded in small devices is often called a microprocessor. Computer processors in fact form the fundamental backbone of all the computing power & cutting edge features that we see nowadays in smart devices.

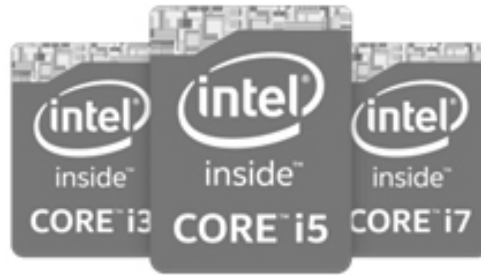


Figure 14.43 – Processor Types

The processor technology advancement is mostly based on Moore's Law. Moore's Law takes its name from former Intel CEO Gordon Moore, who predicted in 1965 that the number of transistors



Figure 14.44 – Upcoming Processor

on integrated circuits would continue to double every other year which in other words means computing power doubles every 18 months.

In this section we will only talk about current & upcoming Intel (since Intel Corp is World's largest and most popular semiconductor chip maker) based processor technologies as applicable to Desktop/PC

devices. Since 1974 Intel has been making different class & generations of processors. But with the success of PC/ Desktop class of devices & association with Microsoft, Intel processors became very popular among the masses. In terms of future, Intel is expected to launch Cannon Lake class of processors (first 8 Core CPU) by 2017 featuring 10 nm manufacturing process.

Find below table showing Intel processor generation timeline:

Code Name	Intel Generation	Process	Year
<b>Kaby Lake</b>	<b>7<sup>th</sup></b>	<b>14 nm</b>	<b>2016 expected</b>
<b>Skylake</b>	<b>6<sup>th</sup></b>	<b>14 nm</b>	<b>2015</b>
<b>Broadwell</b>	<b>5<sup>th</sup></b>	<b>14 nm</b>	<b>2014</b>
<b>Haswell</b>	<b>4<sup>th</sup></b>	<b>22 nm</b>	<b>2013</b>
<b>Ivy Bridge</b>	<b>3<sup>rd</sup></b>	<b>22 nm</b>	<b>2012</b>
<b>Sandy Bridge</b>	<b>2<sup>nd</sup></b>	<b>32 nm</b>	<b>2011</b>
<b>Westmere</b>	<b>1<sup>st</sup></b>	<b>32 nm</b>	<b>2010</b>
<b>Nehalem</b>		<b>45 nm</b>	<b>2008</b>
<b>Conroe</b>		<b>65 nm</b>	<b>2006</b>

Table 14.1 – Processor Timeline

### **USEFUL TIP**

The processor manufacturing process involves “Die Shrink” which assigns nm (Nano Meter) designations to fabrication type used. It is as per International Technology Roadmap for Semiconductors (ITRS). The lesser the nm type more compact is the processor.

### **QUICK REVIEW**

- ▶ What is the latest Intel processor name for PCs?
- ▶ Which is the latest Intel processor generation?

### Multiple Choice Questions

1. Which is the full form of NFC
  - a. Near Field Communication
  - b. Network Field Communication
  - c. Network Force Calculator
  - d. None of Them
2. What is Cortana?
  - a. Search Engine Utility
  - b. File Browser
  - c. Anti Virus
  - d. None of them
3. What is an example of Virtual Reality based device?
  - a. Google Glass
  - b. Oculus Rift
  - c. 3D Printer
  - d. None of them
4. What is the main use of 3D Printing?
  - a. Manufacture physical objects
  - b. Print documents
  - c. Scan documents
  - d. None of them
5. Smart Wearable devices use what kind of Network
  - a. LAN
  - b. WAN
  - c. BAN
  - d. None of them
6. Which inbuilt utility of Windows 10 will you use to work on multiple display screens?
  - a. Wi-Fi Sense
  - b. Snap Assist
  - c. Windows Store
  - d. Windows Hello
7. Which is the name of Biometric Authentication feature of Windows 10?
  - a. Windows Hello
  - b. Windows Passport
  - c. Both A & B
  - d. Cortana
8. Which is the example of a mobile operating system?
  - a. Android M 6.0
  - b. Linux
  - c. Apple ios 9
  - d. Both A & C
9. Which one is a Mobile App Store?
  - a. Google Play store
  - b. Flipkart
  - c. Facebook
  - d. None of Them
10. Which one is an example of Tablet –
  - a. Samsung Note 5
  - b. Apple iPad
  - c. Apple Ipod
  - d. Microsoft Lumia